



## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

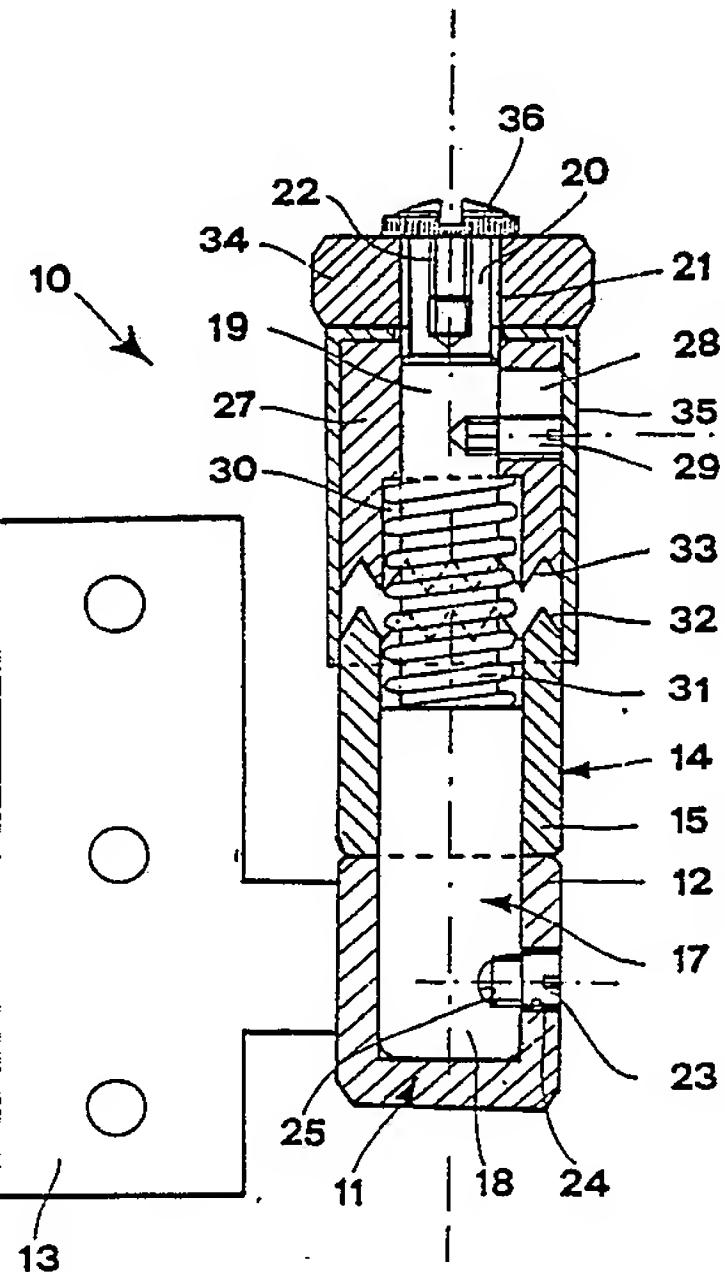
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## (54) Title: HINGE WITH ADJUSTABLE LOCKING POSITIONS

## (57) Abstract

Hinge (10) with an annular slider (27) free to translate along but not rotate round the pin (17) of the hinge pivot (11), which slider (27), by means of a screw (34), can be pressed by hand to cause conjunction of its toothed edge (33) with the similarly toothed opposing edge (32) of the tubular cap (14) thus permitting doors, windows and similar objects to be fixed in the desired angle of opening.



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### HINGE WITH ADJUSTABLE LOCKING POSITIONS

Hinges, especially for opening or closing doors or for window and door frames generally, are well known accessories consisting of the hinge pivot mounted on the fixed structure and the cylindrical tube-like cap mounted on the mobile structure and swinging on the pin forming part of the hinge pivot.

Also well known are the means for holding the door completely open such as, for example, pegs fixed into the floor and 10 spring forks fixed to the door.

If it is required to hold the door in a half-open position, means such as wedges between floor and door or other similar means have to be resorted to with the obvious related difficulties of imprecision and risk of the wedge or similar 15 object coming loose.

The present invention eliminates the above drawbacks at the same time offering considerable advantages as will be explained below.

Subject of the invention is a hinge to which the cylindrical tube-like cap can be fixed in any angular position.

For this purpose an annular sliding means placed round the hinge is free to translate along the pin of said hinge guided by a means that prevents said slider from rotating.

The opposing edges of the eye of said cap and of said slider are provided with suitable means for their male-female conjunction when the slider is pushed to match with the cap overcoming resistance from an elastic part.

This is occasioned by a suitable device for locking the slider in the position of said conjunction.

30 In this way it becomes possible to fix doors, window frames and the like in the desired open position.

In one type of execution the slider is guided by a pin and the like applied transversally to the hinge pin and passing through a longitudinal opening, such as a slot and the like, in the slider.

5 In another type of execution the slider can be guided since, both in that part of the hinge pin along which the slider moves and in that part of said slider's longitudinal aperture matching with the hinge pin, their common constant transversal cross section is square, polygonal generally or is recessed or notched or so shaped as 10 to impede rotation of the slider in relation to the pin.

The means enabling the opposing edges of the eye of the tubular cap and of the slider to lock together are variously shaped teeth, recesses, reliefs and the like provided 15 on said edges or on opposing parts and fixed to the same.

In one type of execution the manual device that presses the slider against the tubular cap impeding rotation of said cap, is a knurled ring nut, and the like, which the fingers can grip and which screws onto the upper threaded 20 end of the hinge pin in direct contact, or in contact by interposing parts, with the top of the slider.

In another type of execution cams, articulating transversally to the top of the hinge pin, act directly or through spacers and the like on the top of the slider.

25 Said cams comprise at least two radial dimensions, practically at  $90^\circ$ , corresponding to two distances between the slider and the tubular cap.

The first dimension allows the tubular cap to rotate freely while the second dimension causes matching between the 30 opposing edges of the slider and of the eye of the tubular

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cap which is thus locked in that position. Movement of the cam from one position to another is made by a hand-operated lever fixed to said cams and preferably aligned with the smaller radial dimensions on the 5 side opposite to cam rotation.

The pin is fixed to the eye of the hinge by removable means to allow the door, or other object on which the tubular cap is fixed, to be lifted off.

In one type of execution a threaded transversal pin passes through a hole in the eye of the tubular cap and screws 10 into a threaded seat in the hinge pin.

In another type of execution a threaded shank, axially fixed to the lower part of the hinge pin, emerges from a hole made in the bottom of the eye of the hinge allowing 15 a nut or similar means to be screwed on.

In another type of execution a manual device presses the slider against the tubular cap and holds it firm by the use of an elastic means, such as Belleville washers or the like, so that when the stress applied by the object, such as a 20 door or some other, on which the tubular cap is mounted, exceeds a certain value, the yielding of said elastic means permits rotation of said object, avoiding excessive stress on said object and on the hinge and avoiding impact with persons or other objects beyond the limits of safety.

25 Characteristics and purposes of the invention will be made even clearer by the following examples of its execution illustrated by drawings.

Fig. 1 Hinge, to be locked by a threaded ring nut, when free.

Fig. 2 The hinge in Fig. 1 with tubular cap turned by 90° 30 cut through longitudinally.

Fig. 3 The hinge in Figs. 1 and 2 locked in position.

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Fig.4 Hinge, to be locked by cams, when free, cut through longitudinally.

Fig.5 The hinge in Fig.4 with tubular cap turned by 90°, in a locked position.

5 The hinge (10) comprises the hinge pivot (11) composed of the eye (12) and fixing plate (13), and the tubular cap (14) composed of the eye (15) and fixing plate (16). The eye (12) of the hinge pivot (11) houses the hinge pin (17) comprising the cylindrical length (18), the upper length (19) of a smaller diameter and the head (20) with external and internal threading respectively (21) and (22). The hinge pin (17) is fixed to the eye (12) by the threaded dowel (23) which, passing through the hole (24), screws into the threaded hole (25) of the hinge pin.

10 15 On the part (19) of the hinge pin the cylindrical slider (27) is inserted, with slot (28) through which the threaded dowel (29), screwed onto the hinge pin (17), passes. The slider comprises a cylindrical housing (30) for the compression spring (31) surrounding the hinge pin (17).

20 25 On the edge of the eye (15) of the tubular cap (14) there are triangular teeth (32) counterposed to the triangular teeth (33) on the edge of the slider (27). The knurled ring nut (34) is screwed onto the outer threading of the head (20) and is counterposed to the slider (27) with interposing protective cover (35). The stop screw (36) limiting the movement of the ring nut, is screwed to the threading inside the head of the hinge pin. In the situation illustrated by Fig.1, the door or similar swinging object, fixed to the tubular cap, can move freely.

30 In order to lock the swinging object in any position, it is sufficient to rotate the ring nut (34) which, compressing

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the spring (31), causes movement of the slider (27) until the two sets of teeth (32), (33) mesh together (Fig.3).

Variant

The hinge (40) comprises the hinge pivot (41) composed of 5 the eye (42) and horizontal hinge pin (43), and the tubular cap (44) composed of the eye (45) and horizontal pin (46).

The eye (42) of the hinge pivot (41) houses the pin (47) comprising the small lower threaded pin (48), the cylindrical length (49), the length (50) having a square cross section, and the upper length (51) with internal threading (52).

Said pin (47) is fixed to the eye (42) by means of the nut (53) which screws onto the thread of the small pin (48) 15 that passes through the back hole (54) of the eye (42).

The eye (45) of the tubular cap (44) is fitted onto the cylindrical part (49) of the pin while the slider (55) is fitted on the upper length (51), the square ring (56) being fixed to the lower end of said slider.

20 The cylindrical cavity (57) of the slider (55) houses the helical compression spring (58), preloaded by the threaded head (59) which screws onto the threading (73) of the slider and which presents a hole (60) through which the length (51) of the pin (47) passes.

25 At the top of the pin the support (61) with transversal threaded holes (65) is fixed by means of the screw (62).

Said holes receive the sides screws (63), (64) on which are articulated the shanks of the fork (66) formed by the cams (67), (68).

30 The lever (69) is fixed to said fork.

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On the edge of the eye (45) of the tubular cap there are saw-shaped teeth (71) opposing the teeth (72) on the edge of the slider (55).

Fig. 4 shows that the fork (66) is turned so that the lesser projecting parts (75) of the cams (67), (68) face towards the top (74) of the slider (55).

Therefore the swinging door or other object fixed to the tubular cap can rotate freely.

In order to lock the tubular cap in any angular position it 10 is sufficient to rotate the lever of the fork to a horizontal position to make the most projecting part (76) of the cam (67), (68) correspond with the top (74) of the slider (55). This presses the slider against the tubular cap overcoming the resistance to it opposed by the spring, and the 15 two sets of teeth then mesh (Fig.5) locking the tubular cap and therefore the revolving part.

To detach the revolving part from the jamb, frame or the like, all that is required, on the first type, is to unscrew the threaded dowel (23) and, on the second type, the nut (53) 20 for easy withdrawal of the one pin and the other.

It is therefore possible, by simple means and an easy and convenient movement, to fix in the desired position a door or any object swinging on a hinge.

The locking system is secure and strong and can withstand 25 high pressure due to wind or other forces, providing a valid means for increasing the comfort, convenience as well as the safety of the user.

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CLAIMS

1. Hinge (10), (40) characterized in that the tubular cap (14), (44), can be fixed to the hinge pivot (11), (41) in any angular position by means of an annular slider (27) 5 (55) free to translate along the pin (17), (47) of the hinge pivot (11), (41) guided by a means (29), (56) that prevents rotation, the opposing edges of the eye (15), (45) of the tubular cap (14), (44) and of the slider (27), (55) being provided with means (32), (33), (71), (72) able to make 10 male-female conjunction when, by means of a manually operated device (34), (67), (68) and overcoming the resistance set up by an elastic part (31), (58), said slider (27), (55) is pressed against the tubular cap (14), (44) and fixed in that position, all the above in order to enable doors, window frames and the like to be fixed in the preferred angular 15 position.
2. Hinge (10), (40) as in claim 1, characterized in that the slider (27) is guided by means of a peg (29) and the like mounted transversally to the pin (17) of the hinge pivot (11) and passing through a longitudinal opening, such 20 as a slot (28) or the like, in said slider.
3. Hinge (10), (40) as in claim 1, characterized in that the slider (55) is guided by an internal ring (56) fixed to said slider (55) having a hole with a constant cross section 25 of a square or generally polygonal shape, said cross section being common to that of a length (50) of the pin (47) of the hinge pivot (41) on which said ring (56) slides.
4. Hinge (10), (40) as in claim 1, characterized in that the means for securing conjunction of the opposing edges of the eye (15), (45) of the tubular cap (14), (44) and of the slider (27), (55) are variously shaped teeth (33), (71), (72)

recesses, reliefs and the like made on said edges or on parts fixed to said edges.

5. Hinge (10), (40) as in claim 1, characterized in that the manual device that presses the slider (27) against the 5 tubular cap (14) impeding rotation of said cap, is a ring nut (34) with knurling or the like to assist finger grip, which nut is screwed onto the upper threaded head (20) of the pin (17) of the hinge pivot (11) in direct contact or through interposing parts (35) with the top of the slider 10 (27).

6. Hinge (10), (40) as in claim 1, characterized in that the manual device that presses the slider (55) against the tubular cap (44) impeding rotation of said cap, comprises cams (67), (68) articulated on an axis lying transversally 15 to the top (51) of the pin (47) of the hinge pivot (41) said cams acting directly, or by means of spacers (59) or the like, on the top of the slider (55), said cams (67), (68) comprising at least two radial dimensions practically at 90° corresponding to two distances of the slider (55) away 20 from the tubular cap (44) the first dimension permitting free rotation of said tubular cap (44), the second dimension determining matching of the opposing edges of the slider (55) and of the eye (45) of the tubular cap (44), locking said cap, it being possible to move the cams (67), (68) from one position to another by means of a manually operated lever (69) 25 fixed to said cams (67), (68), preferably aligned at the smaller radial dimension on the side opposite to the axis of rotation of the cams (67), (68).

7. Hinge (10), (40) as in claim 1, characterized in that 30 the pin (17), (47) of the pivot hinge (11), (41) is held by

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removeable means to said hinge pivot to allow withdrawal of the door or other body fixed to the tubular cap.

8. Hinge (10), (40) as in claim 7, characterized in that the removeable means holding the pin (17) to the hinge pivot (11) is a transversal threaded peg (23) which passes through a hole (24) in the eye (12) of the hinge pivot(11) and from there screws into a threaded seat (25) in the pin (17).

9. Hinge (10), (40) as in claim 7, characterized in that the removeable means holding the pin(47) to the hinge pivot (41) is a threaded shank (48), axially fixed to the lower end (49) of said pin (47), that emerges from a hole (54) in the bottom of the eye (42) of the hinge pivot (41) it being possible to screw a nut (53) or similar means onto said shank (48).

10. Hinge (10), (40) as in claim 1, characterized in that a manual device (34), (67), (68) pushes the slider (27), (55) against the tubular cap (14), (44) holding said cap firmly by means of an elastic device such as Belleville washers and the like so that when the stress applied by an object, such as a door or the like on which the tubular cap (14), (44) is mounted, exceeds a certain value, by yielding said elastic device permits rotation of said object, avoiding excessive stress both on said object and on the hinge, and avoiding impact with persons or with other objects beyond the limits of safety.

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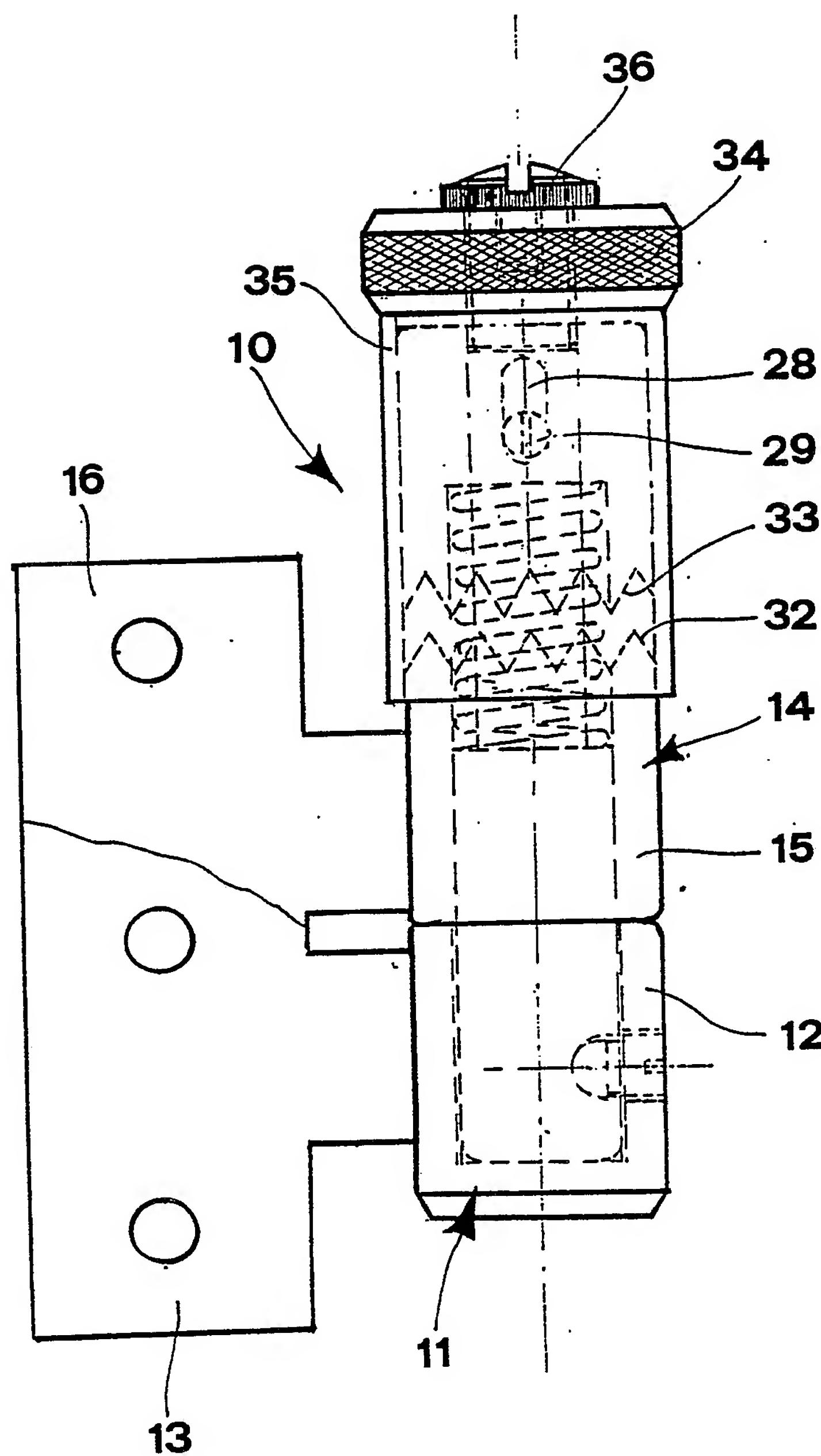


fig. 1

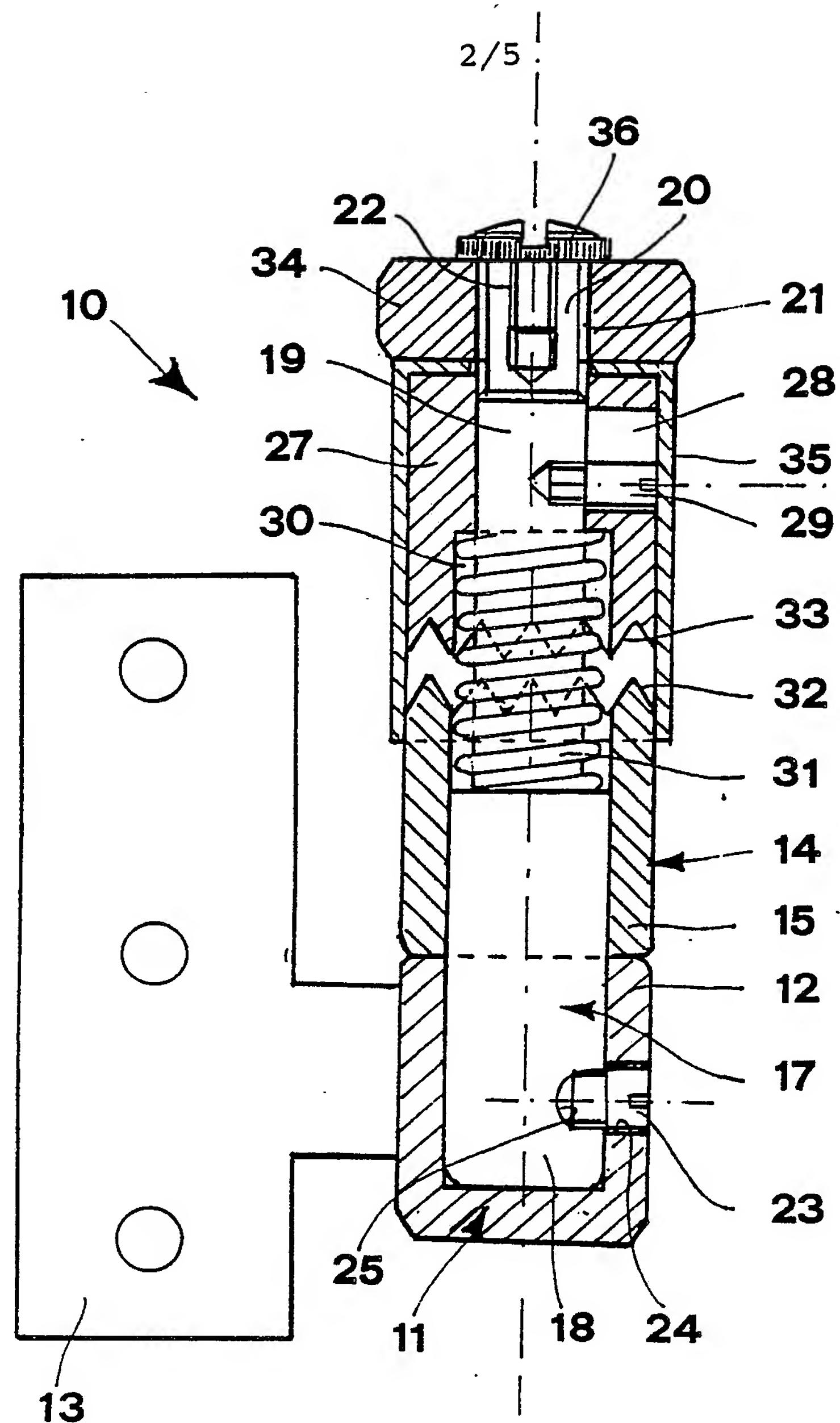


fig. 2

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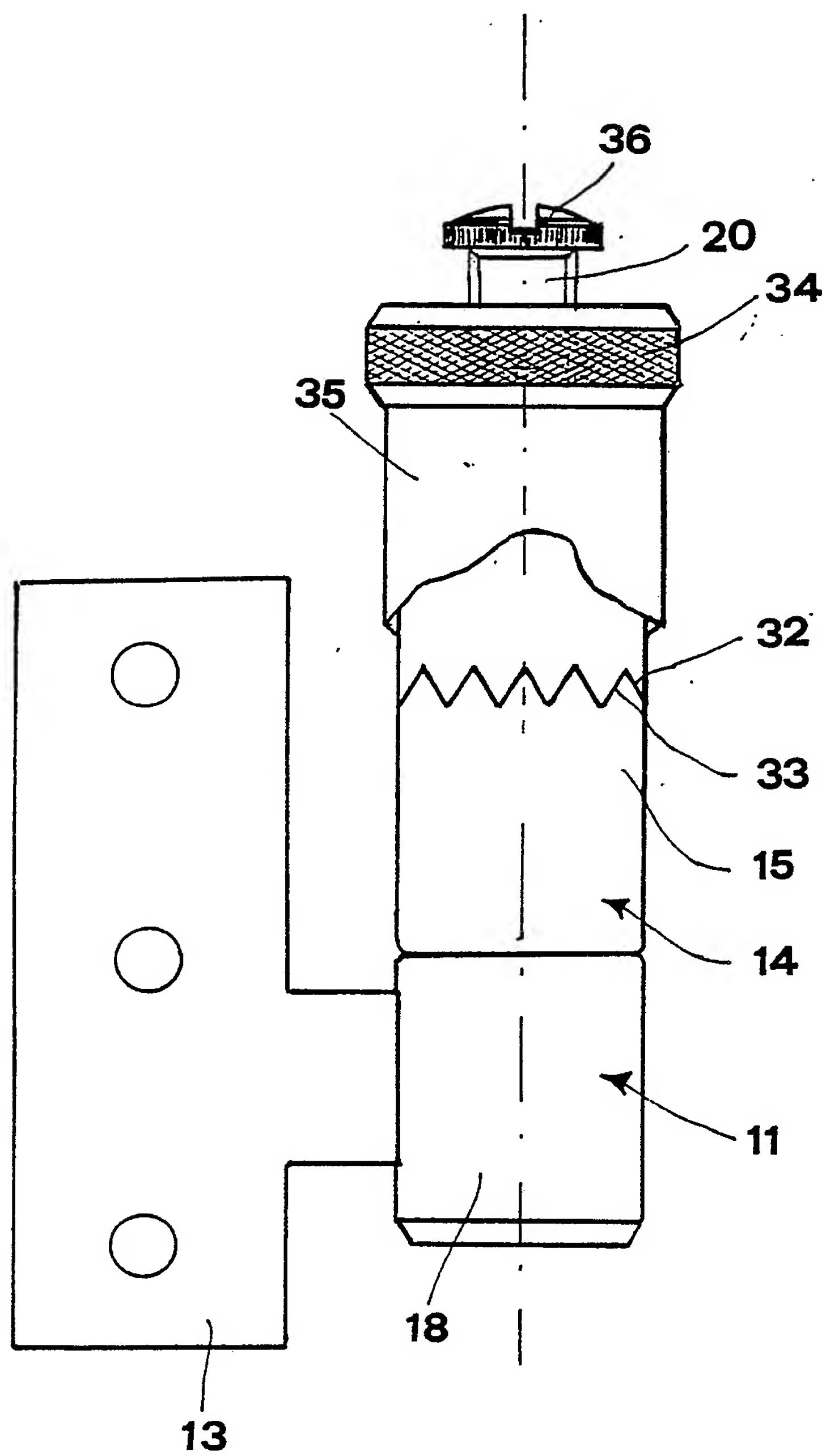
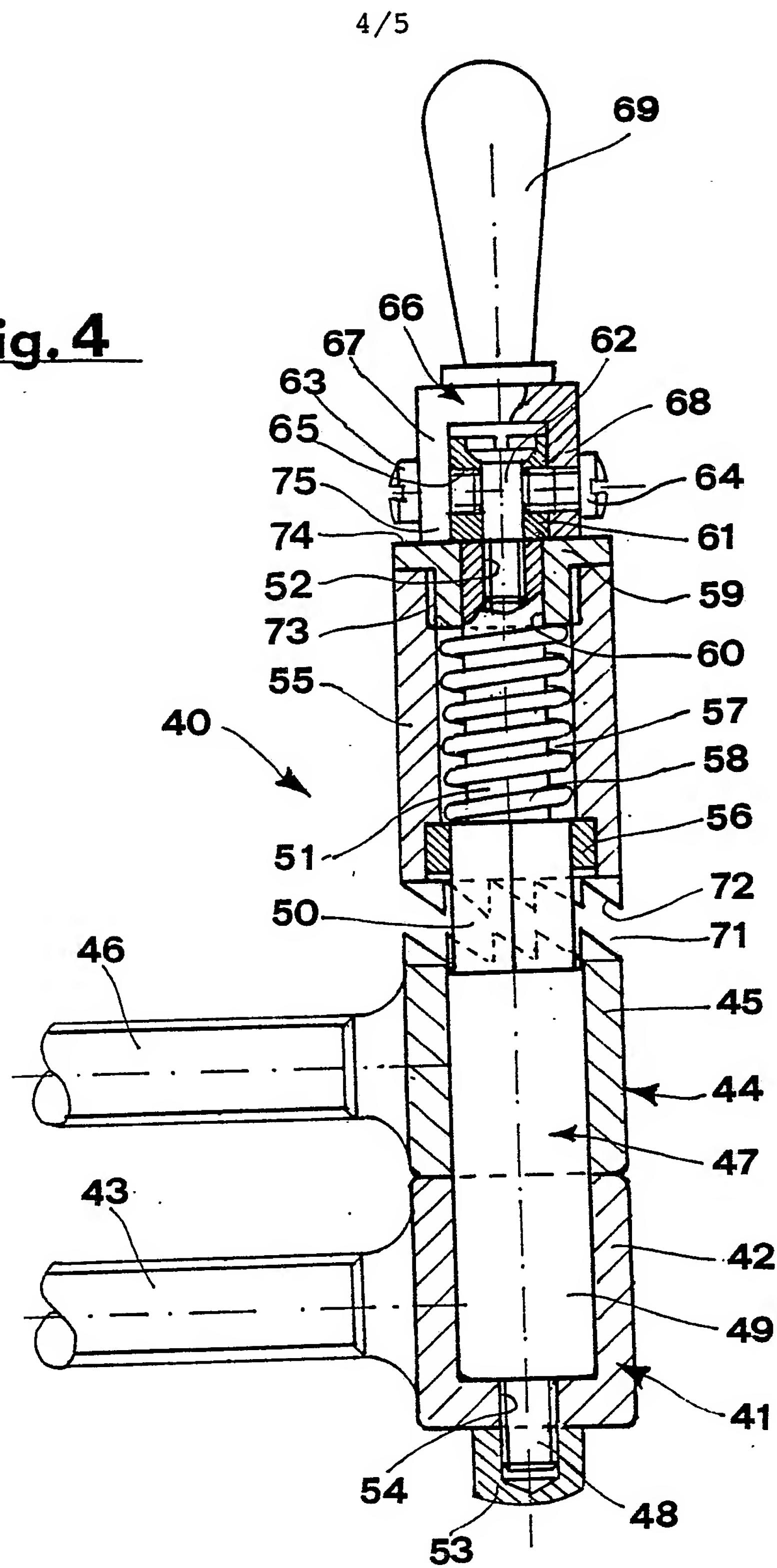
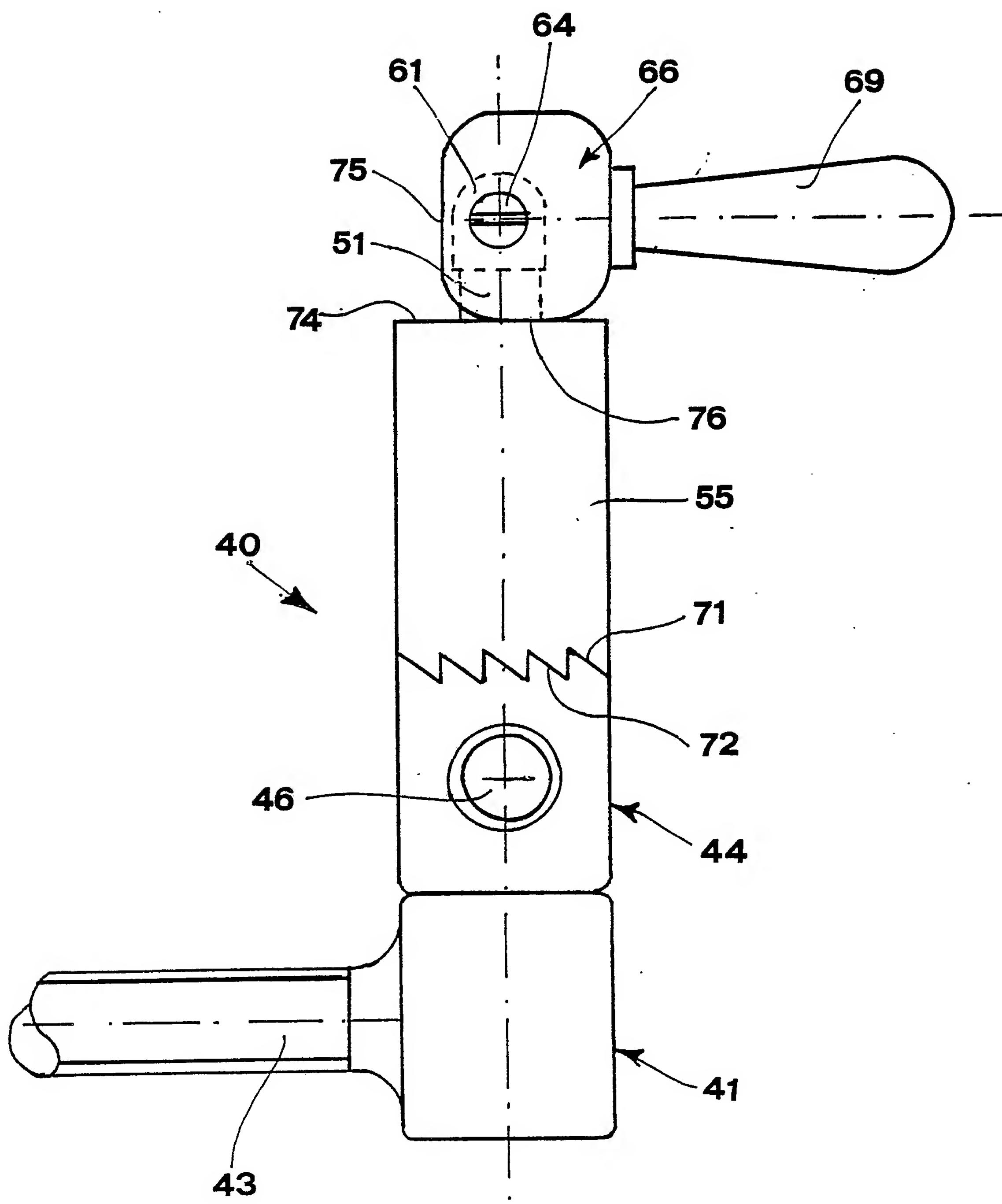


fig. 3

fig. 4

5/5

fig. 5

# INTERNATIONAL SEARCH REPORT

International Application No. PCT/IT 87/00063

## I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) \*

According to International Patent Classification (IPC) or to both National Classification and IPC

IPC<sup>4</sup>: E 05 D 11/10

## II. FIELDS SEARCHED

Minimum Documentation Searched ?

Classification System	Classification Symbols
IPC <sup>4</sup>	E 05 D

Documentation Searched other than Minimum Documentation  
to the Extent that such Documents are Included in the Fields Searched \*

## III. DOCUMENTS CONSIDERED TO BE RELEVANT\*

Category *	Citation of Document, <sup>11</sup> with indication, where appropriate, of the relevant passages <sup>12</sup>	Relevant to Claim No. <sup>13</sup>
X	DE, C, 362343 (SIMSHÄUSER) 26 October 1922 see the whole document --	1,2,4
X	FR, A, 389512 (JORDAN) 11 September 1908 see page 1, line 25	1,4,6
A	--	3
A	US, A, 1707628 (DONOSA) 2 April 1929 see page 2, lines 10-36 --	2
A	US, A, 1534758 (BARTHOLOMEW) 21 April 1925 see page 1, lines 88-99; figure 2 --	5
A	EP, A, 0142429 (RAUNER) 22 May 1985 see page 4, lines 7-19; figure 6	7-9
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\* Special categories of cited documents: <sup>10</sup>

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"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

## IV. CERTIFICATION

Date of the Actual Completion of the International Search

23rd September 1987

Date of Mailing of this International Search Report

16 OCT 1987

International Searching Authority

EUROPEAN PATENT OFFICE

Signature of Authorized Officer

M. VAN MOL



ANNEX TO THE INTERNATIONAL SEARCH REPORT ON

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INTERNATIONAL APPLICATION NO.

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PCT/IT 87/00063 (SA 17833)

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This Annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report. The members are as contained in the European Patent Office EDP file on 30/09/87

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE-C- 362343		None	
FR-A- 389512		None	
US-A- 1707628		None	
US-A- 1534758		None	
EP-A- 0142429	22/05/85	FR-A- 2554497 WO-A- 8502222 AU-A- 3555184	10/05/85 23/05/85 03/06/85

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**INVENTOR-INFORMATION:**

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**EUR-CL (EPC):** E05D011/10

**US-CL-CURRENT:** 16/235 , 16/319

**ABSTRACT:**

CHG DATE=19990617 STATUS=O>Hinge (10) with an annular slider (27) free to translate along but not rotate round the pin (17) of the hinge pivot (11), which slider (27), by means of a screw (34), can be pressed by hand to cause conjunction of its toothed edge (33) with the similarly toothed opposing edge (32) of the tubular cap (14) thus permitting doors, windows and similar objects to be fixed in the desired angle of opening.